

ANNEX XV TO THE PROTOCOL

Report of the Fifteenth Joint Working Group Meeting
on Cooperation in the Field of Marine and Fishery Science and Technology between
the National Oceanic and Atmospheric Administration of
the United States of America
and
the State Oceanic Administration of
the People's Republic of China



SUMMARY REPORT

In accordance with Annex XIV to the Protocol on Marine and Fishery Science and Technology Cooperation between the United States of America and the People's Republic of China, and at the invitation of Dr. David Evans, Assistant Administrator of the National Oceanic and Atmospheric Administration (NOAA) of the United States of America, Mr. Sun Zhihui, Deputy Administrator of the State Oceanic Administration of the People's Republic of China, led a delegation to the United States from March 1-9, 2002. Dr. Evans and Mr. Sun co-chaired the Fifteenth Meeting of the U.S.-China Joint Working Group (JWG) on Cooperation in the Field of Marine and Fishery Science and Technology in Silver Spring, Maryland, USA, on March 5-6, 2002.

On behalf of the U.S. delegation, Dr. David Evans opened the 15th JWG meeting by extending a warm welcome to the Chinese delegation and its new chairman, Mr. Sun Zhihui. Mr. Sun expressed his pleasure at leading the Chinese delegation and to co-chair the 15th JWG meeting. Dr. Evans and Mr. Sun introduced the members of their delegations (delegation participants listed in Appendix I) and exchanged opening remarks.

The co-chairs noted that recent diplomatic efforts between the U.S. and China have made much headway in many areas of common interest. The co-chairs hoped that the relationship between China and the U.S. in science and technology cooperation will continue to broaden and deepen under the marine and fisheries protocol.

The co-chairs endorsed continued cooperation under the five existing programs, and recommended that enhanced collaboration in the future should focus on the Role of the Ocean in Climate, Data and Information Exchange, and Integrated Coastal Zone Management, and supported the provisional establishment of a panel on Polar Sciences under the Protocol. The

Chinese side proposed new areas of interest, including mitigation and reduction of marine disasters, utilization of biological genetic resources from the deep ocean, and sustainable fishery management.

The delegations agreed to the agenda for the 15th JWG meeting (see agenda in Appendix II). The delegations reviewed and discussed the programmatic accomplishments since the 14th JWG meeting held in September 1999, Hangzhou, China, and expressed their satisfaction with the accomplishments to-date (Annex XV, Appendix III summarizes the progress of cooperative activities implemented under the Role of the Ocean in Climate Change and the Marine Environmental Services Programs which currently do not have designated chairmen. In addition, this includes summaries of accomplishments for the remaining three programs: the Data and Information Exchange, the Living Marine Resources, and the Marine and Coastal Management). Both sides expressed interest to rejuvenate functions of the two programs by developing more organized and formalized activities under the role of the Ocean in Climate Change and the Marine Environmental Services, including identification of possible chairmen for those activities. The details of this would be worked out between the executive secretaries of the Protocol. Further, both China and the US endorsed the proposal of establishing a new panel on polar sciences on a provisional basis and to be determined at the 16th meeting. Dr. Zhang Zhanhai from CAA/SOA and Dr. John Calder from OAR/NOAA will co-chair the new panel. The 1st Joint Coordination Panel for Polar Sciences Cooperation was tentatively scheduled to be held in late spring/early summer 2003 in the U.S. before the 16th JWG meeting is convened.

The delegations agreed to cooperate in new areas identified in Appendix IV. Highlights of these discussions are summarized below.

The Role of the Ocean in Climate Change

The world is focusing more on understanding the role of the ocean in climate change, and the development of operational tools for short term climate prediction. The September 1999 U.S.-China Symposium on Impacts of Ocean Variability on Climate Change held in Beijing set the foundation for improved coordination between the two countries in coupled ocean/atmosphere modeling and ocean observations, including ARGO. In 2001, NOAA hosted an ocean/atmosphere modeler from the First Institute of Oceanography in Qingdao, for 8 months at Princeton University in New Jersey. This year, two Chinese engineers from the Second Institute of Oceanography in Hangzhou are currently visiting the University of Washington and the NOAA/Atlantic Oceanographic and Meteorological Laboratory (AOML) in Miami, Florida, to study calibration and deployment procedures for Argo deployment, as well as float data processing, analysis and assimilation techniques.

Dr. Ming Ji presented an overview of GFDL (Geophysical Fluid Dynamics Laboratory)/NOAA-China collaboration on ocean modeling/data assimilation, and proposed to host one research scientist from China at GFDL's Princeton facility for one year in this area of research. China agreed to select qualified candidates for consideration and submit the names by fall, 2002 (see Appendix IV.1). Both sides also agreed to continued future cooperation in securing funding for Argo floats deployment and scientist exchange on modeling of coupled air-sea interactions.

Oceanographic Data and Information

Mr. Steve Worley presented a proposal for exchange on surface, land, and ocean data needed for the U.S. National Centers for Environmental Prediction (NCEP)/National Center for Atmospheric Research (NCAR) Global Reanalysis Project. SOA expressed its intention to collaborate with other relevant agencies in China and make available needed ocean and atmospheric data and information in support of the U.S. global reanalysis project, particularly those data from 1955 and earlier (see Appendix IV.2). Both sides expressed that continued cooperation between SOA/Chinese National Oceanographic Data Center (CNODC) and U.S. COADS project is beneficial. In particular, historical data rescue, through digitization, and exchanges of research archives was recommended (Maury data from Germany).

Mr. Robert Gelfeld, U.S. panel executive secretary, looked forward to continued cooperation in this field and hoped to get the 7th joint coordination panel meeting report signed by China. The Chinese delegation confirmed to nominate a new Chinese panel chairman to sign the 7th meeting report after the 15th JWG meeting. The 8th joint coordination panel meeting on data and information cooperation will be decided by the co-chairs of the panel through correspondence.

Living Marine Resources

Since the first official U.S. aquaculture delegation's visit to China in 1991, bilateral efforts being made under the U.S.-China Living Marine Resources (LMR) Program have improved the conduct of cooperative research projects and educational exchange on aquaculture between the two countries. Both sides shared mutual understanding that it is important to optimize integrated aquaculture and fisheries and to adopt eco-friendly practices to help sustain and increase seafood production. Both countries realized the need of a holistic approach to manage coastal areas more sustainably. The delegations expressed their interest to further the development of ideas on convening a workshop on integrated and ecosystem-based management of coastal waters. This could be done by co-hosting a workshop in 2003 between representatives from the Marine and Coastal Management Panel, the Living Marine Resources Panel and the Yellow Sea Large Marine Ecosystem (LME) project, housed under the Marine Environmental Services program. The workshop would explore how to develop an integrated approach for utilizing the resources and interests of the two sides. The co-chairs of the LMR panel will have further discussions through correspondence.

Dr. James McVey presented proposals for the new generation techniques: coastal modeling, ecosystem function by various species groups, recirculating systems and offshore aquaculture all in the context of taking a holistic ecosystem approach (see Appendix IV.3). Both sides agreed to continue to focus on the ongoing projects endorsed at the 4th joint coordination panel meeting held in 2000, Hawaii. The 5th joint coordination panel meeting is scheduled to be held April 18-22, 2002, Sanya, Hainan Province, China.

Marine and Coastal Management

Mr. Jonathan Justi reviewed recent cooperation and future directions of the Marine and Coastal Management Panel. Both sides expressed support for three ongoing projects: integrated coastal management, U.S.-China marine reserve partnerships (3), and environmental quality monitoring. In addition, Mr. Justi presented a status report of the regional proposal for the Beibu Gulf during the meeting (see Appendix IV.4), and both sides agreed that this initiative is

developing satisfactorily. Interest was expressed in exploring ways to integrate the complementary research work being pursued in sustainable aquaculture and ecosystem modeling under the LMR program with the integrated coastal management efforts of the Beibu Gulf Proposal. Both sides expressed expectation to complete the "Marine Environmental Monitoring in China: Lessons Learned (1972-1999)" report before the end of 2002. The Chinese side confirmed the draft report (both English and Chinese) is being reviewed for submission to NOAA for further action. The 3rd joint panel meeting was tentatively scheduled to be held in late summer/early fall 2002 in China.

Marine Environmental Services

In recent years, NOAA National Marine Fisheries Service has worked collaboratively with SOA to develop the Yellow Sea Large Marine Ecosystem (LME) Project, introducing ecosystem-based assessment and management methodologies that will be implemented jointly by China and the Republic of Korea. Dr. Ned Cyr presented a proposal on Yellow Sea Large Marine Ecosystem (LME) for scientific and technical cooperation. NOAA expressed interest to continue the existing cooperation with SOA in providing scientific and technical assistance and training in methodologies for advanced measurements of ecosystem-wide productivity and carrying capacity for fish and fisheries (see Appendix IV.5).

Mr. John Hotaling from NOAA presented U.S. plans on developing a new generation fisheries research vessel. Chinese side remarked that this new capability could be a potential source for future technical exchanges between the two countries (see Appendix IV.5).

Polar Sciences

The proposal to establish a new panel on polar sciences came out of meetings held in October, 2001 in Beijing between officials of NOAA and several Chinese agencies, including SOA's Chinese Arctic and Antarctic Administration (CAA). Dr. ZHANG Zhanhai from CAA/SOA presented a proposal for establishing a new panel on polar sciences under the Protocol. Both sides endorsed to establish the new Panel on Polar Sciences on a provisional basis, and agreed that an official establishment of the proposed panel would be determined during the 16th JWG meeting. Dr. John Calder from NOAA and Dr. ZHANG Zhanhai from SOA would serve as co-chairs, and plan to organize a workshop on polar sciences to be held in May 2002, Qingdao, China. This meeting would bring together scientific experts from both countries to help identify future specific cooperative activities.

Additional Topics/Interests Presented

The Chinese side proposed additional topics and interests for further discussions with the U.S. on six new areas (refer to the list of topics and contact points provided in Appendix IV.7). Both sides agreed to potentially develop these ideas through contacts in U.S. and in China over the next 18 months, and report the results of their findings at the 16th JWG meeting.

In his final remarks, Mr. Sun expressed his appreciation on behalf of the Chinese delegation for warm hospitality and thorough preparations that have been made by NOAA for the meeting. On behalf of the U.S. delegation, Dr. Evans emphasized the need to continue meeting to facilitate cooperation under the auspices of the U.S.-China Science and Technology Agreement. The delegations confirmed to submit the summary report to the U.S.-China Joint Committee Meeting

of the Science and Technology Agreement, scheduled to be held from April 22-26, 2002, Beijing, China.

The Chinese delegation agreed to host the 16th JWG meeting on Cooperation in the Field of Marine and Fishery Science and Technology in Qingdao in fall, 2003. The specific venue and date of this meeting will be confirmed through correspondence. This summary report is signed on March 6, 2002, in Silver Spring, Maryland, U.S.A. in duplicate in English and Chinese, both texts being equally authentic.

David L. Evans
U.S. Chairman
For the National Oceanic and
Atmospheric Administration

SUN Zhihui
Chinese Chairman
For the State Oceanic Administration

Appendix I

List of Participants

U.S. Delegation

David L. Evans, U.S. Chairperson and Assistant Administrator for Oceanic and Atmospheric Research, National Oceanic and Atmospheric Administration

Charles Ehler, Acting Director, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration

René Eppli, Director, International Activities Office, Office of the Oceanic and Atmospheric Research, National Oceanic and Atmospheric Administration

James P. McVey, Aquaculture Program Director, National Sea Grant College Program, Office of the Oceanic and Atmospheric Research, National Oceanic and Atmospheric Administration

John Calder, Director, Office of Arctic Research, Office of the Oceanic and Atmospheric Research, National Oceanic and Atmospheric Administration

Kurt J. Schnebele, Deputy Director, National Oceanographic Data Center, National Environmental Satellite Data and Information Service, National Oceanic and Atmospheric Administration

Ned Cyr, Oceanographer, Office of Science and Technology, National Marine Fisheries Service, National Oceanic and Atmospheric Administration

John Hotaling, Office of Science and Technology, National Marine Fisheries Service, National Oceanic and Atmospheric Administration

Jonathan Justi, Asia Team Leader, International Program Office, National Ocean Service, National Oceanic and Atmospheric Administration

Robert Gelfeld, National Oceanographic Data Center, National Environmental Satellite Data and Information Service, National Oceanic and Atmospheric Administration

Muriel Cole, International Ocean Programs, Office of the Oceanic and Atmospheric Research, National Oceanic and Atmospheric Administration

Dosoo Jang, U.S. Executive Secretary, International Activities Office, Office of the Oceanic and Atmospheric Research, National Oceanic and Atmospheric Administration

Ming Ji, Research Physical Scientist, Office of Global Programs, Office of the Oceanic and Atmospheric Research, National Oceanic and Atmospheric Administration

Kelly Turner, International Activities Office, National Environmental Satellite Data and Information Service, National Oceanic and Atmospheric Administration

Steven J. Worley, National Center for Atmospheric Research

Gregory S. Groth, Foreign Service Officer, East Asia and Pacific Rim Countries, Office of Science and Technology Cooperation, Bureau of Oceans, Environment and Science, U.S. Department of State

Chuanyun Bao, Interpreter

PRC Delegation

SUN Zhihui, Chinese Co-Chairperson and Deputy Administrator, State Oceanic Administration

ZHANG Dengyi, Advisor to the State Oceanic Administration

LI Jingguang, Director-General, Department of International Cooperation, State Oceanic Administration

ZHOU Qinghai, Director-General, Department of Science and Technology State Oceanic Administration

ZHANG Zhanhai, Deputy Director-General, Chinese Antarctic and Arctic Administration, State Oceanic Administration

LIANG Fengkui, Chinese Executive Secretary and Director, Division of Bilateral Affairs,
Department of International Cooperation, State Oceanic Administration

YIN Weiping, Director, Division of Science and Technology, Third Institute of Oceanography,
State Oceanic Administration

LI Yingren, Director, Division of Foreign Relations and Cooperation, Chinese Academy of
Fishery Sciences, Ministry of Agriculture

JIN Xiaoming, Minister Counselor for Science and Technology, Embassy of the People's
Republic of China

XU Jie, Counselor for Science and Technology, Embassy of the People's Republic of China

Appendix II

Proposed Agenda
15th U.S.-China Marine and Fishery Science and Technology
Joint Working Group Meeting

March 1-9, 2002
New York, NY, Silver Spring, MD, and Miami, FL, USA

Friday, March 1, 2002

15:18	Chinese delegation arrives in La Guardia, New York via China Air #8515
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Saturday, March 2, 2002

09:00	Visit New York City
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19:00	Meet with aquaculture faculty of the University of Connecticut and
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Bridgeport Regional Aquaculture Vocational School

Sunday, March 3, 2002

16:00 Chinese delegation arrives in Washington, D.C.

Monday, March 4, 2002

17:00 Meeting of Executive Secretaries

18:00 Opening Reception
Hilton Silver Spring (Room *Annapolis*)

Tuesday, March 5, 2002

Part I. Opening Session: Hilton Silver Spring (Room *Counsel*)

08:00-08:30 Continental Breakfast

08:30-08:40 Welcome & Introduction of the Delegations
David Evans, U.S. Chairman (Lead)
SUN Zhihui, Chinese Chairman

08:40-09:00 Opening Remarks
David Evans

09:00-09:20 Remarks
SUN Zhihui

09:20-09:40 Adoption of the Agenda (U.S. Lead)

09:40-10:00 Coffee Break

Part II. Review of Cooperative Activities Since the 14th JWG (1999-2001)

10:00-10:20 The Role of the Ocean in Climate Change (U.S. Lead)

10:20-10:40 Oceanographic Data and Information (U.S. Lead)

10:40-11:00 Living Marine Resources (China Lead)

11:00-11:20 Marine and Coastal Management (U.S. Lead)

11:20-11:40 Marine Environmental Services (China Lead)

11:40-13:00 Lunch (Room *Assembly*)

Part III. Discussion and Adoption of New Cooperative Activities Proposals

13:00-13:40 The Role of the Ocean in Climate Change

-*Training on ocean observations (Argo)* (China lead)

-*Exchange of coupled air-sea climate modelers* (U.S. lead)

13:40-14:20 Oceanographic Data and Information

-*Oceanographic/climate data gaps from China* (U.S. lead)

14:20-15:00 Living Marine Resources

-*Future prospects on offshore aquaculture and coastal modeling* (U.S. lead)

15:00-15:20 Coffee Break

15:20-16:00 Marine and Coastal Management

-*Review and further development on the Beibu Gulf project*
(U.S. lead)

16:00-16:40 Marine Environmental Services

-*Yellow Sea Large Marine Ecosystem (LME)* (U.S. lead)

-*Environmentally-sound fishing research vessels*
(U.S. lead)

Part IV. Discussion of Special Topic

16:40-17:00	A new panel on Polar Sciences <i>-Proposal on the establishment of a new panel on “Polar Sciences” (China lead)</i>
17:00-17:15	Wrap-up: Schedule for the next meeting, etc.
17:15	Adjourn
18:00-18:30	Refreshments at Hilton Silver Spring (<i>Room Assembly Foyer</i>)
18:30-20:30	Banquet in honor of the U.S. Delegation (<i>Room Assembly</i>)

Wednesday, March 6, 2002

Part V. Closing Ceremony: NOAA SSMC-3, Room #11836 (11th Floor)

09:00-09:40	Meeting of panel chairs/or executive secretaries in preparation for the summary report
09:40-10:00	Coffee Break
10:00-11:00	Adoption of summary report (<i>Plenary Meeting resumes</i>)
11:00-11:30	Closing remarks SUN Zhihui, Chinese Chairman David Evans, U.S. Chairman (Wrap-up)
	Signing of summary report The 15 th JWG Meeting concludes and adjourns
12:00-13:30	Luncheon in honor of Chinese delegation (NOAA Cafeteria, SSMC-3, 1 st Floor)
14:00	Depart NOAA to airport
17:10	Travel from BWI to Ft. Lauderdale, FL

Thursday, March 7, 2002

11:00	Meet with the NOAA/South Florida Ecosystem Restoration Prediction and Modeling (SFERPM) Program in Key Largo
14:00	Meet with the Florida Keys National Marine Sanctuary Management Program

Friday, March 8, 2002

9:00	Meet with the Atlantic Oceanographic and Meteorological Laboratory (AOML) on ocean observations and Florida Bay and Everglades projects
14:00	Meet with the Southeast Fishery Science Center on regional fishery management and artificial reef management

Saturday, March 9, 2002

07:00	Delegation returns to China
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Appendix III

Review of Activities: 1999-2001

1. The Role of the Ocean in Climate Change

Ocean Observations

On September 21-22, 1999 the U.S. National Oceanic and Atmospheric Administration (NOAA) and the Chinese State Oceanic Administration (SOA) co-hosted the U.S.-China Symposium on Impacts of Ocean Variability on Climate Change in Beijing. The meeting assembled an interdisciplinary group of scientific experts and high-level administrators from both the U.S. and China to discuss seasonal-to-interannual climate variability, societal impacts, and forecasting capabilities. The U.S. provided a special presentation on the future of global ocean observations in the next 20 years that especially highlighted Argo. NOAA and SOA discussed the Argo topic and agreed to take steps to further cooperate in ocean monitoring and climate forecasting. In May 2000, Seven member delegation from SOA, Chinese Academy of Science, and the Ministry of Science and Technology visited the U.S. to discuss with NOAA and university officials and scientists current and future U.S. ocean observation efforts, including plans to launch Argo. In November 2000, officials from NOAA and the University of Washington met with Professor Jianping Xu and other officials and experts at the Second Institute of Oceanography of SOA in Hangzhou, China to discuss technical aspects of Argo floats.

Modeling of Air-Sea Interactions

Professor Fangli Qiao from the First Institute of Oceanography of SOA in Qingdao, China, who was selected by the Princeton University Atmospheric and Oceanic Science Program Visiting Scientist Selection Committee, had visited Princeton University in New Jersey for the period from March 10-November 10, 2001. During the visit, Professor Qiao had collaborated with Dr. Tal Ezer on climate model development for oceanic and atmospheric interactions under the auspices of the U.S.-China Marine and Fishery Science and Technology Protocol. During his stay in New Jersey, NOAA and Princeton University covered Professor Qiao's living expenses,

health insurance and other logistical arrangements. Professor Qiao completed a research on the analysis of high frequency oscillations, entitled “on the zonal distribution of high frequency oscillations obtained from altimeter data” co-authored by F. Qiao, T. Ezer, and Y. Yuan.

2. Oceanographic Data and Information

The Joint Coordination Panel for Data and Information Cooperation held its Seventh Meeting at the National Geophysical Data Center in Boulder, Colorado, U.S.A. during the period from November 29-December 1, 2000. For more details, please refer to the “Summary Report of the Seventh Meeting of the PRC-U.S. Joint Coordination Panel for Data and Information Cooperation.”

3. Living Marine Resources

The U.S.-China Joint Coordination Panel for Living Marine Resources (LMR) held its Fourth Meeting in Honolulu, Hawaii, USA during the period from February 28-March 1, 2000. For more details, please refer to the “Summary Report of the Fourth U.S.-China Joint Coordination Panel for Living Marine Resources.”

4. Marine and Coastal Management

The U.S.-China Joint Coordination Panel for Marine and Coastal Management held its Second Meeting in San Diego, California, USA during the period from July 24-26, 1999. For more details, please refer to the “Minutes of the Second U.S.-China Joint Coordination Panel for Marine and Coastal Management.”

5. Marine Environmental Services

Among the 50 large marine ecosystems (LMEs) in the world ocean, the Yellow Sea LME has been one of the most significantly affected by human development. NOAA National Marine Fisheries Service worked with SOA to develop the Yellow Sea Large Marine Ecosystem Project in the past several years. The long-term development/environment objective of the Project is “Ecosystem-based, environmentally-sustainable management and use of the Yellow Sea LME and its watershed: Reducing development stress and promoting sustainable development of the ecosystem from a densely populated, heavily urbanized, and industrialized semi-enclosed shelf area. The Yellow Sea LME Project has been approved by the Global Environmental Facility (GEF) Council and Secretariat for five years at a level of \$25 million. NOAA will continue to provide scientific and technical expertise and support to assist in program implementation and to advance ecosystem-based management in the Yellow Sea LME..

Appendix IV

Summary of New Cooperative Activities: 2002-2004

1. The Role of the Ocean in Climate Change

Ocean Observations

U.S. and China will continue cooperation by participating in the implementation of the global ARGO program. NOAA will provide scientific and technical assistance and training in the development of capacity in China so that it will be able to manage its own national Argo program. China plans to launch initial deployment of 3 Argo floats in 2002 summer, and intends to deploy more floats in the coming years if additional funding would be secured. Specific examples of collaborative activities include technical assistance in the deployment of Argo floats, training on the utilization and assimilation of resulting data to produce improved climate forecasts. In collaboration with the POGO (Partnerships for Observations for Global Ocean) Fellowship Program, NOAA will support a training for two ocean engineers from the Second Institute of Oceanography in Hangzhou, China, at the University of Washington in Seattle, Washington, and NOAA Atlantic Oceanographic and Meteorological Laboratory in Miami, Florida, USA.

U.S. contact: Rene Eppe, OAR/NOAA

Chinese contact: LI Jingguang, Department of International Cooperation/SOA

Coupled Air-Sea Modeling

NOAA and SOA will continue to promote international partnership to improve climate modeling and forecasting. The next step in climate research is to utilize the U.S.-China Marine and Fishery Science and Technology Protocol to develop more interconnectedness/interaction between the oceanic and atmospheric aspects for improved climate forecasts. NOAA and SOA will continue to cooperate in exchanging coupled ocean/atmosphere modelers. NOAA Geophysical Fluid Dynamics Laboratory (GFDL) proposes to host one research scientist from China at GFDL's Princeton facility for one year. The primary area of research should be in ocean modeling/ocean data assimilation with focus on investigating the applications of Argo data for global and regional ocean state estimation. The primary methodology in the proposed investigation is to use the GFDL variational ocean data assimilation system and the GFDL global ocean model. Because of the close linkage between an ocean data assimilation system and an ocean model, the Chinese scientist will also participating GFDL activities in development of the next generation global ocean model. Qualifications: An earned Ph.D degree in physical oceanography, meteorology or other relevant earth science fields; Experience in ocean observations, or ocean modeling; Knowledge in theories of ocean data assimilation and ocean

modeling is critical; At least 4 years experience in programming with FORTRAN, or other advanced programming language such as C, C++; Knowledge in parallel computing for scientific applications is also essential.

U.S. contact: Ming Ji, OGP/OAR/NOAA

Chinese contact: LI Jingguang, Department of International Cooperation/SOA

2. Data and Information

Surface, Land, and Ocean Data Exchange

U.S.-China will continue exchanges of oceanographic/climate data and information and improve communication among major oceanographic/climate scientists in both countries. Both NOAA and SOA will support to improve the exchange of oceanographic/climate data and information under existing bilateral S&T frameworks, both at the policy and the working levels. On a global scale, the U.S. and China are significant contributors, and moreover, the land areas represented by the U.S. and China are also significant in a global sense. Upper air data and river flow data obtained from China prior to 1956 would be an important contribution to the recent U.S. NCEP/NCAR Global Atmospheric Reanalysis project. This issues was presented at the Seventh U.S.-China Joint Coordination Panel for Data and Information Cooperation.

U.S. contact: Steve Worley, NCAR

Chinese contact: LI Jingguang, Department of International Cooperation/SOA

3. Living Marine Resources

Offshore Aquaculture and Coastal Modeling

The U.S. and China will continue to exchange knowledge and experience and promote the ongoing cooperation to optimize integrated aquaculture and fisheries, and adopt eco-friendly practices to help sustain and increase production in both countries. Continued mutual interests between the two countries are the commercialization of cold-water shrimp, mitigation of shellfish disease, transfer of seaweed (nori) bioremediation technology, technology transfer of ornamental fish, coastal modeling, offshore aquaculture, and improvement of aquaculture educational curricula. Also, both countries will help advance offshore aquaculture technologies that are environmentally sustainable and develop a regulatory framework that facilitates offshore aquaculture development. Both countries will continue support for improved understanding and applications of coastal modeling techniques to coastal ecosystem management in the coastal areas where multi-user activities are taking place, with heavy aquaculture and fisheries activities. The U.S. intends to continue its efforts to manage coastal ecosystems in more holistic ways and is developing several ecosystem models with their Chinese colleagues for some coastal areas around China. At the next LMR joint coordination panel meeting, both U.S. and China will exchange dialogues among aquaculture scientists from both sides that are interested in offshore ecosystem-based aquaculture and coastal modeling topics to determine the present status of development and capabilities in both countries.

U.S. contact: Jim McVey, Sea Grant/OAR/NOAA

Chinese contact: LI Yingren, Chinese Academy of Fishery Sciences

4. Marine and Coastal Management

The 2nd Joint Coordination Panel Meeting took place in July 24-26 1999 in San Diego, California. The Third Panel Meeting will take place in 2002 in China at a location and date to be confirmed through correspondence of the US and Chinese Panel Co-chairpersons.

U.S. contact: Charles N. Ehler, NOS/NOAA

Chinese contact: SOA

Partner Reserve Exchanges

Exchanges between the Florida Keys National Marine Sanctuary-Sanya National Coral Reserve were in the areas of Coral Ecology Monitoring and Mooring Buoy Training and Demonstration. Exchanges between Chesapeake Bay National Estuarine Research Reserve-Tianjin Paleocoastal and Wetland Reserve Exchange were emphasized exchange of information concerning monitoring, ecotourism, geographical information systems (GIS) applications, the new Tianjin reserve education plan, and other areas. Exchanges between the *Rookery Bay National Estuarine Research Reserve-Shankou National Mangrove Reserve* focused on ecotourism, education and outreach and research cooperation.

Geographic Information Systems (GIS)

A delegation of five Chinese experts for a technical exchange on coastal GIS took place in 2001. Discussions covered demonstrations of metadata issues, ocean planning and boundary mapping, protected areas siting, application of remote sensing data, sea grass mapping, habitat suitability modeling, coral reef mapping, and demonstrations of GIS products produced by SOA for coastal Guangxi Zhuang A.R.

Regional Case Study: “Integrated Marine Ecological Management for the Beibu Gulf: An International Initiative”

In summer 2000, SOA provided a draft proposal for a multi-year, regional case study. Key elements of the program include fostering integrated coastal management at three sites with technical cooperation in ecological monitoring, local and regional GIS applications, habitat research, education and outreach. The proposal has been revised and edited with input from the IUCN-The World Conservation Union and other potential partners. IUCN-The World Conservation Union will now contact U.S. foundations to explore potential interest. Results will be discussed at the Third Panel meeting.

Marine Pollution Assessment and Management

In 2000, the National Ocean Service and State Oceanic Administration agreed to develop a joint report summarizing the national marine environmental monitoring infrastructure and operational mechanisms and data/information collected from 1972-1999 in China. The first draft, tentatively entitled “Marine Environmental Monitoring in China: Lessons learned from Successes and Failures” is currently under review in China and will be provided to NOAA shortly. The report will be distributed in hard copy and via the internet in 2002.

National Sea Area Use Policy, Management, and Legislation

In October 2000, NOS hosted an interagency delegation led by SOA Administrator Wang Shuguang to the United States for meetings with U.S. agencies involved in sea area use management at the national and local level.

5. Marine Environmental Services

Yellow Sea Large Marine Ecosystem (LME) Project

The Yellow Sea Large Marine Ecosystem Project will include joint international efforts between China and the Republic of Korea to:

- Develop and implement regional strategies and actions for sustainable management of fisheries and mariculture, including the conduct of cooperative productivity, and fish population surveys and assessments.
- Develop and implement ecosystem-wide initiatives and actions for biodiversity

- protection.
- Develop and implement actions to reduce human and environmental stress on the ecosystem
- Develop and implement regional capacity building for carrying forward the long term project objectives.

NOAA's contributions will be scientific and technical, with assistance and training in methodologies for advanced measurements of ecosystem-wide productivity and carrying capacity for fish and fisheries, applications of satellite remote sensing, fishery demographics, environmental indexing, and improved socioeconomic and governance profiling and assessments.

U.S. contact: Ned Cyr, NMFS/NOAA

Chinese contact: LI Jingguang, Department of International Cooperation/SOA

State-of-Art Fisheries Research Vessels (FRV)

NOAA National Marine Fisheries Service (NMFS) received \$59 million in appropriations to begin construction of the first of a series of new, state-of-the-art fisheries research vessels (FRV). These new vessels are required to conduct essential stock assessment surveys, monitor fish and marine mammals species, assess ecological changes, and provide the best available data to rebuild and sustain our fisheries. NMFS scientists have developed expertise in marine fisheries research and management, contributing to the global effort to building sustainable fisheries and managing them through sound science. The FRV initiative is crucial to achieve the future conduct of our fisheries research in sustainable and environmentally sound manners. NOAA/NMFS has intentions to develop a new partnership with China on the NOAA Fisheries' new initiative on constructing a series of new, state-of-art fisheries research vessels (FRV).

U.S. contact: Lamarr Trott, NMFS/NOAA

Chinese contact: LI Yingren, Chinese Academy of Fishery Sciences

6. Polar Sciences

As a result of meetings during October 8-13, 2001 in Beijing and Hangzhou between officials of NOAA and officials of several Chinese agencies, including SOA, Chinese Arctic and Antarctic Administration (CAA), the Second Institute of Oceanography (SIO), the Chinese Meteorological Administration (CMA), the Institute of Atmospheric Physics (IAP), the Chinese Academy of Sciences (CAS), and the Chinese National Science Foundation (CNSF), there seems to be general agreement that a Panel on Polar Sciences should be established under the U.S.-China Marine and Fishery Science and Technology Protocol. Both countries agreed to establish the new Panel on Polar Sciences on a provisional basis at the 15th Joint Working Group meeting on March 5, 2002, and its future be determined at the next Joint Working Group meeting supposedly to be held in fall 2003.

The provisional Panel on Polar Sciences will be co-chaired by Dr. John Calder, Director of Arctic Research Office, OAR/NOAA, and Dr. Zhang Zhanhai, Deputy Director of the Chinese Arctic and Antarctic Administration of SOA. The co-chairs will organize a workshop to be held in China in May 2002 to bring together scientific experts from both countries to identify specific research projects and principal investigators, as well as available platforms (icebreakers and Arctic research stations) that could be undertaken jointly. Specific projects would be initiated in 2002 or 2003, assuming the workshop is successful and specific projects are identified.

The long-range goal of the Panel on Polar Sciences will be to develop mutual interests in the following five scientific themes:

- Role of the Arctic in Global Climate Change
- Long-range Transport of Contaminants to the Arctic
- Polar Ocean Exploration
- Antarctic Environment Monitoring and Research
- Atmosphere-Ice-Ocean Interaction in the Southern Ocean

U.S. contact: John Calder, OAR/NOAA

Chinese contact: Zhang Zhanhai, CAA/SOA

7. Additional Topics and Interests Presented

The Chinese delegation proposed the following topics and interests for further discussions and development of ideas through correspondence following the 15th JWG meeting, and report the results of findings at the next JWG meeting.

A. Marine Environmental Forecasting and Prediction

- 1) Research on sea wave forecasting models and operational numerical sea wave forecasting.

U.S. contact: Hsusan S. Chen and Tsann-Wang Yu, NCEP/NOAA (TBD)

Chinese contact: YU Zhouwen, National Marine Environmental
Forecasting Center (NMEFC)/NOAA

- 2) Research on 3-D numerical marine environment forecast techniques for the Northern Pacific Ocean and the China Seas

U.S. contact: Peter Chu, U.S. Naval Postgraduate School (TBD)

Chinese contact: Song Xuejia, NMEFC/SOA

- 3) Research on the mechanisms of red-tide formation and its prediction

U.S. contact: (TBD)

Chinese contact: NMEFC/SOA

- 4) El Niño prediction

U.S. contact: TBD

Chinese contact: NMEFC/SOA

- 5) Evaluation of impacts of coastal hazards

U.S. contact: TBD

Chinese contact: NMEFC/SOA

B. Ocean observations for climate change

- 1) Receiving, processing and analysis of data from Argo floats

U.S. contact: Steve Riser, UW (TBD)

Chinese contact: XU Jianping, SIO/SOA

- 2) Research on key technology relating to Argo floats

U.S. contact: Dean Roemmich, Scripps Institute of Oceanography (TBD)

Chinese contact: YU Lizhong, Institute of Ocean Technology/SOA

3) Argo data assimilation

U.S. contact: Scripps Institute of Oceanography (TBD)

Chinese contact: NMEFC/SOA

4) Global warming and its influence on the relatively high-latitude coral reef recovery

U.S. contact: Zhan Xiaoyong, University of Kansas (TBD)

Chinese contact: YU Kefu, Chinese Academy of Sciences

C. Sea area use management and policy

1) Study on policies and regulations on ICM

U.S. contact: NOS/NOAA

Chinese contact: SOA

2) Sea area use and management

U.S. contact: NOS/NOAA

Chinese contact: SOA

3) Coastal boundary delimitation between provinces

U.S. contact: NOS/NOAA

Chinese contact: SOA

4) Data and information system for ICM

U.S. contact: NOS/NOAA

Chinese contact: SOA

5) Law enforcement relating to ocean management

U.S. contact: NOS/NOAA

Chinese contact: China Marine Surveillance/SOA

D. Polar sciences

See Appendix IV.6

E. Research on environmental adaption and pharmaceutical application of microorganism

U.S. contact: Douglas H. Bartlett, Scripps Institute of Oceanography (TBD)

Bill J. Baker, University of South Florida (TBD)

Chinese contact: YE Deyan, Third Institute of Oceanography (TIO)/SOA

Zeng Runying, TIO/SOA

F. Other

1) Research on the procedure for flying after diving

U.S. contact: (TBD)

Chinese contact: Shanghai Underwater Engineering Institute

2) Joint training program for commercial divers

U.S. contact: (TBD)

Chinese contact: Shanghai Underwater Engineering Institute

